

# Strengthening Relationships Between Health and Environment Partners

Community Health Promotion Summit

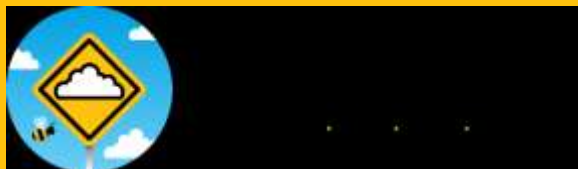
Thursday, January 24<sup>th</sup>, 2019

Baylee Cunningham, MSES  
Senior Environmental Scientist  
Strategic Services  
Public Works and Utilities  
City of Wichita

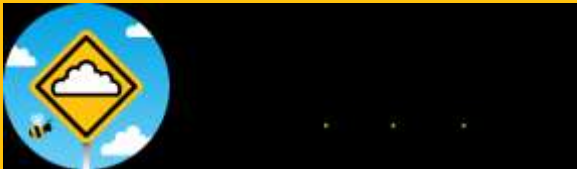


# summary

- Air Quality History and Legislation
- Toxic Air Pollution
- Ozone
- Protecting and Improving Health



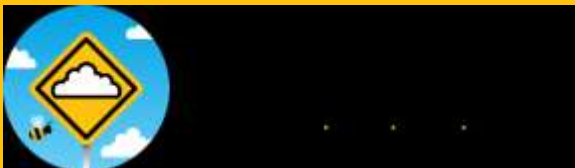
# Air quality history



# Air quality history

## The Early Period

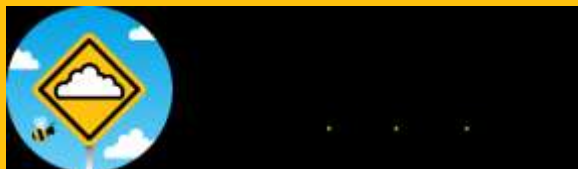
- 900 BC
  - King Tukulti of Egypt remarks on unpleasant odors from asphalt mining outside the city of Babylon
- 400 BC
  - Greek physician Hippocrates wrote in his essay *On Airs, Waters, and Places*:
    - “If you want to learn about the health of a population, look at the air they breath, the water they drink, and the places where they live.”
- 61 AD
  - The Roman philosopher Seneca wrote:
    - “As soon as I had gotten out of the heavy air of Rome and from the stink of the smoky chimneys thereof, which, being stirred, poured forth whatever pestilential vapors and soot they had enclosed in them, I felt an alteration of my disposition.”



# Air quality history

## The Middle Ages

- 1273
  - The first smoke abatement law passed by King Edward I in England, noting that coal is “prejudicial to health”
- 1306
  - A Royal Proclamation prohibiting the burning of “sea coal” (bituminous, or “soft” coal) in London was passed and an industrialist was beheaded for violating the order



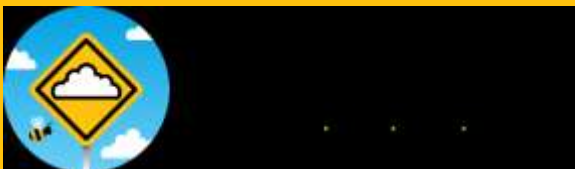
# Air quality history

## The Gilded Age

- Named for the many great fortunes made and way of life the wealth supported
- Smoke became a symbol of “civilization” and success
- 1875
  - Public Health Act of 1875
- 1898
  - Coal Smoke Abatement Society Formed



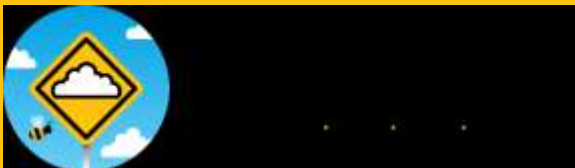
Pittsburgh, PA “The Smokey City” steel mills in 1906



# Air quality history

Finally, a public outcry

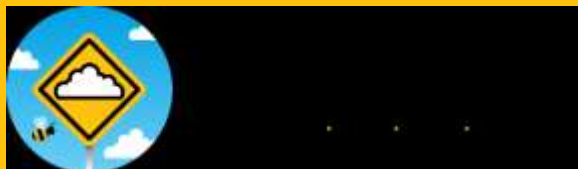
- Donora, PA, October 26<sup>th</sup> - 31<sup>st</sup> , 1948
  - Sulfur dioxide, carbon monoxide and metal dust emissions from the plants and coal furnaces located in the valley were trapped in the town by a temperature inversion
  - 20 people died
  - Nearly 50% of the town of 13,500 became ill
- London, England, December 5<sup>th</sup>, 1952
  - Dense smog brought the city to a standstill for 4 days
  - Death toll nearly 12,000



# Air quality history

## The environmental movement

- 1955
  - Air Pollution Control Act of 1955
- 1967
  - Amendments to Air Pollution Control Act
- 1970
  - United States Clean Air Act
  - Environmental Protection Agency Founded

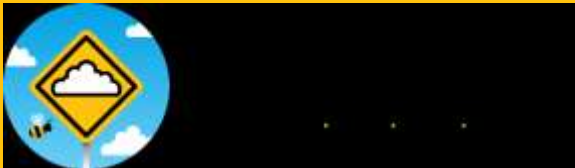




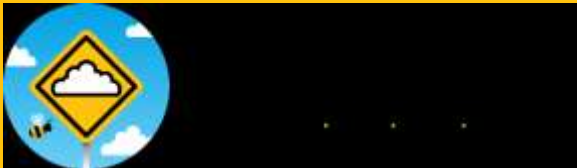
# Air quality history

## The clean air act

- Established to control air pollution on a national level
- Administered by the United States Environmental Protection Agency (EPA)
- Implemented by state, local and tribal government agencies
- 1970
  - Amendments required regulations for point-source (industrial) and mobile source emissions
- 1977
  - Amendments included Prevention of Significant Deterioration
  - Requires permits to build or add stationary sources of air pollution
- 1990
  - Amendments addressed acid rain, ozone depletion, and toxic air pollution

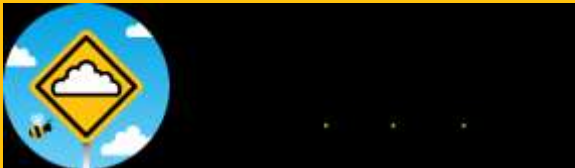


# Toxic air pollution



# Toxic air pollution

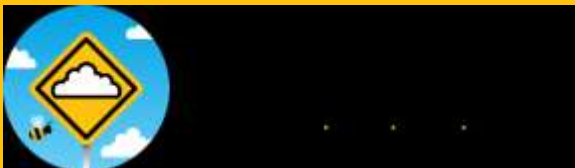
- Pollutants known or suspected to cause cancer or other serious health effects
  - Reproductive effects
  - Birth defects
- Clean Air Act currently lists 188 toxic air pollutants
  - Each toxic is regulated by the EPA
  - Examples include
    - Dioxins
    - Benzene
    - Arsenic
    - Mercury
- Emitted from various sources including
  - Motor vehicles
  - Manufacturing plants



# Toxic air pollution

## Health and Environmental Effects

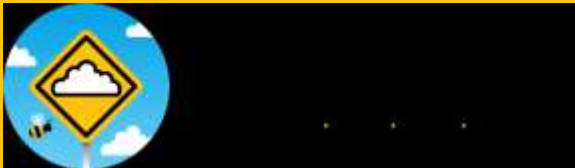
- At sufficient concentrations and exposure durations, human health effects can include:
  - Cancer
  - Poisoning, and
  - Rapid onset of sickness (such as nausea or difficulty in breathing)
- Other less measurable effects include
  - Immunological
  - Neurological
  - Reproductive
  - Developmental and
  - Respiratory effects
- Toxic air pollutants may also be deposited onto soil or into lakes and streams, thereby affecting ecological systems and eventually human health through consumption of contaminated food



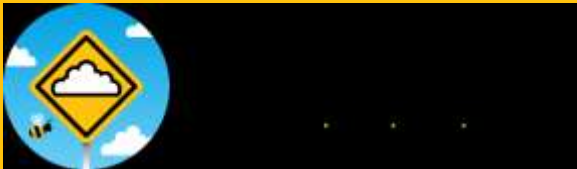
# Toxic air pollution

## six principal pollutants

- EPA has established National Ambient Air Quality Standards for six principal pollutants
- Also called Criteria Pollutants, they include:
  - Carbon Monoxide (CO)
  - Lead (Pb)
  - Nitrogen Dioxide (NO<sub>2</sub>)
  - Ozone (O<sub>3</sub>)
  - Particulate Matter (PM-10)
  - Sulfur Dioxide (SO<sub>2</sub>)
- The objective is to ensure that major sources of toxic air pollution are well controlled



# Ozone ( $\text{o}_3$ )



# Ozone (O<sub>3</sub>)

Good Up High, Bad Nearby

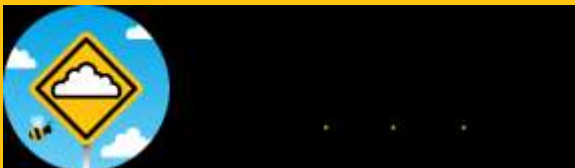
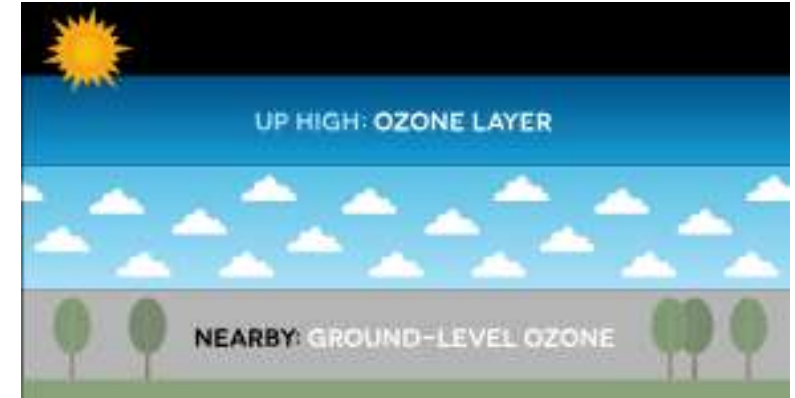
- Ozone is a gas that occurs both in the Earth's upper atmosphere and at ground level
- Ozone can be “good” or “bad” for your health and the environment, depending on its location in the atmosphere
  - Stratosphere
    - “Good” ozone layer extends upward from about 6 to 30 miles and protects life on Earth from the sun's harmful ultraviolet (UV) rays
  - Troposphere
    - Ground level or “bad” ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation
    - It is a main ingredient of urban smog



# Ozone (O<sub>3</sub>)

Good Up High, Bad Nearby

- Ozone is a gas that occurs both in the Earth's upper atmosphere and at ground level
- Ozone can be “good” or “bad” for your health and the environment, depending on its location in the atmosphere
  - Stratosphere
    - “Good” ozone layer extends upward from about 6 to 30 miles and protects life on Earth from the sun's harmful ultraviolet (UV) rays
  - Troposphere
    - Ground level or “bad” ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation
    - It is a main ingredient of urban smog

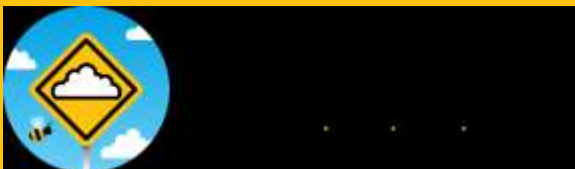
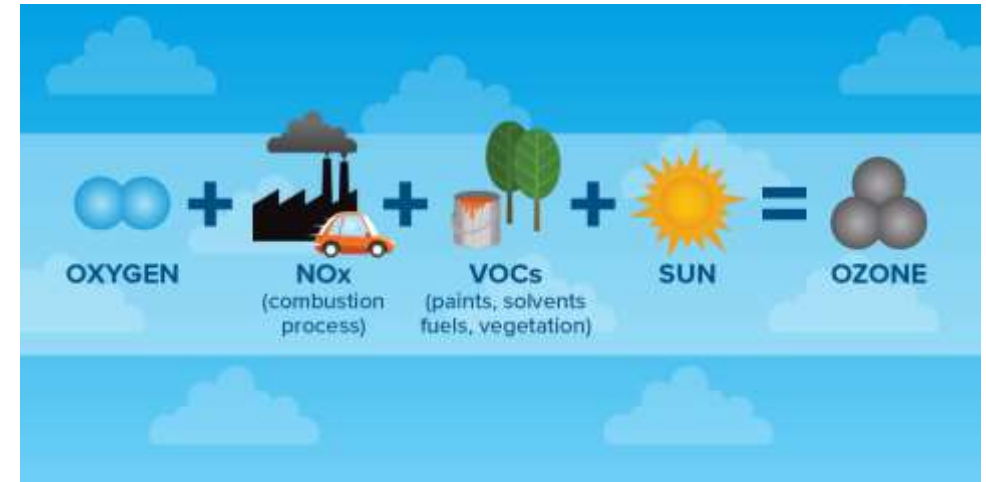




# Ozone (O<sub>3</sub>)

## ground-level ozone formation

- When Nitrogen Oxides (NO<sub>x</sub>) and Volatile Organic Compounds (VOCs) mix in the presence of sunlight, Ozone is formed
- Wichita and the surrounding MSA generate both NO<sub>x</sub> and VOC emissions due to our industry and way of life



# Ozone (O<sub>3</sub>)

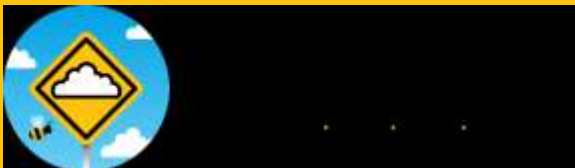
## Sources

- **NOx emissions sources include:**

- Automobiles
- Trucks
- Non-road vehicles (e.g., construction equipment, boats, etc.)
- Power plants
- Industrial boilers
- Cement kilns
- Turbines

- **VOC emission sources include:**

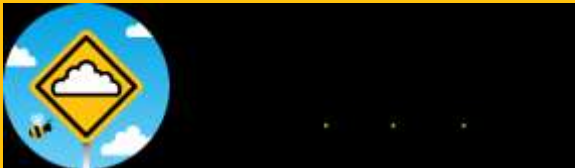
- Paints, inks, lacquers
- Adhesives, solvents
- Wood coating
- Metal part painting
- Plastic part coating
- Fabric coating
- Cabinet/countertop lamination
- Furniture coating
- Printing presses
- Screen printing units
- Motor vehicle repair shops



# Ozone (O<sub>3</sub>)

## national ambient air quality standards

- Environmental Protection Agency specifies a maximum allowed measurement for ozone (O<sub>3</sub>) to be present in outdoor air
- Current allowed measurement for ozone is 0.070 parts per million (ppm)
  - More commonly referred to as 70 parts per billion (ppb)
- Measurement is determined by the fourth-highest daily maximum 8-hour average, averaged across three consecutive years
- Areas within each state are "designated" as either meeting ozone standards (attainment) or not meeting them (non-attainment)
- The EPA helps areas maintain standards through a collaborative effort called the Ozone Advance Program



# Ozone (O<sub>3</sub>)

economic Impacts of nonattainment

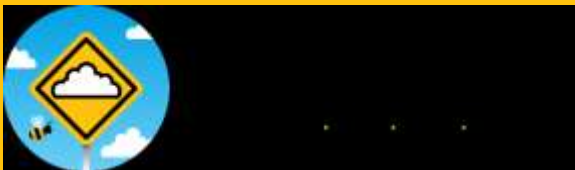
## BUSINESS & INDUSTRY

- More Federal Regulation
- More Stringent Permitting Requirements for Industry
- Increased Costs for Businesses
- Loss of New Business
- Road Funding Impacts

## CITIZENS & VISITORS

- New Fuel Blend Requirement
- Higher Fuel Costs
- Higher Energy Costs
- Health Care Costs for Some Individuals
- Decreased Quality of Life

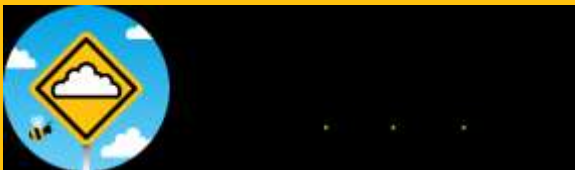
**Cost estimates range in the tens of millions of dollars annually and are ongoing for at least 10 years.**



# Ozone (O<sub>3</sub>)

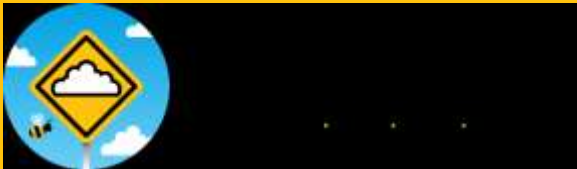
## Health Impacts of Nonattainment

- Breathing poor quality air can result in a number of health effects. They include:
  - Coughing
  - Throat irritation
  - Chest discomfort including pain, burning and wheezing
  - Inflammation of airways and shortness of breath
  - Decrease in lung function
  - Increased asthma attacks
  - Increased hospital admissions



# Protecting & Improving Environment and health

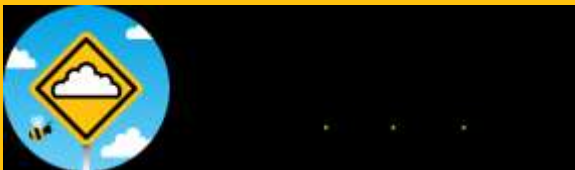
Strengthening Relationships Between Health and Environmental Partners



# Protecting & Improving Environment & health

## Ozone Alerts

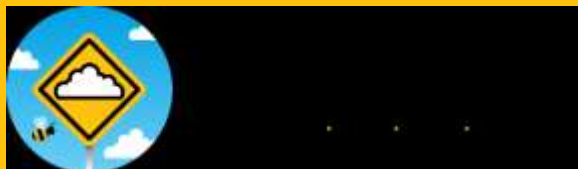
- Goal–Avoid High Ozone Days
- Proactive vs Reactive
- 24hr Advance Notice
- Operational Adjustments
- **Sign up for Ozone Alert Emails**



# Protecting & Improving Environment & health

regional strategy

- City of Wichita
  - No Idling Policies
  - Diesel Fleet Improvements
  - Ozone Advance Program
- Ozone Advance
  - Be Air Aware Program
  - Ozone Alerts
  - Clean Air Car Clinics
  - Air Quality Improvement Task Force
  - Ozone Action Plan Partnerships
- Road Projects
  - Elevated Railroad Bridges
  - Intelligent Transportation System (ITS)
  - Wichita Master Bicycle Master Plan
- Public Transportation
  - Transit Alternative Fuel Study
  - Vanpool study
- Open Burning Education & Restrictions

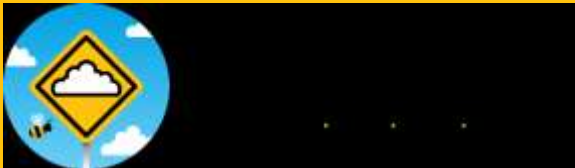




# Protecting & Improving Environment & health

Take the pledge

- Share a ride, walk or bike
- Ride the bus
- Fuel when it's cool — after 6pm
- Take your lunch to work
- Reduce idling
- Avoid the drive-through – consider going inside at restaurants, banks, and pharmacies
- Conserve energy at home and work



# Protecting & Improving Environment & health

## Partnerships

- Present to KU School of Medicine students on affects of poor air quality
  - Worked with KU School of Medicine on thesis examining correlation between ER visits and high ozone days
- Attend Health and Medical Partners Monthly Conference Call – read minutes and provide comment when necessary
- Currently exploring potential partnerships with Health ICT and American Red Cross to organize and Air Quality Summit

